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EXAMINER

YUSHIN, NIKOLAY K

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2893

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,277	Applicant(s) KOMATSU, SHIGEYUKI	
	Examiner NIKOLAY YUSHIN	Art Unit 2893	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-13 is/are rejected.
- 7) ☒ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/18/2006; 02/21/2008; 04/17/2008</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Drawings***

The drawings (Figs. 8A – 8 C) are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: The dual use pad 310 and the metal wiring 320 are mentioned in [00236- 00239], but they are not shown in Figs. 8 A - C. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 12 recites the limitation "the probe" in line 4. There is insufficient antecedent basis for this limitation in the claim. There are no mentions of “a probe” in claim 11 or claim 7. There is “a probe” only in claim 1.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 - 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Karasawa et al., Japanese Patent Application, JP2000-232127.

In re Claim 1, Karasawa discloses a semiconductor device having a plurality of pads (1 - 20; 1A – 20A) above a main surface of a semiconductor substrate 25 as terminals for external connection, wherein the plurality of pads (1 – 20; 1A – 20A) include dual use pads (1A – 20A) which are used in both a probing test and assembly, and assembly pads (1 -20) which are not used in the probing test, the dual use pads (1A – 20A) are provided in a first area (25 outside 26) above the main surface of the semiconductor substrate 25, an application of pressure by a probe during the probing test being permitted in the first area, and the assembly pads (1- 20) are provided in a second area 26 above the main surface of the semiconductor substrate 25 (Drawings 1, 5; [0017], [0018]), the application of pressure by the probe during the probing test being not permitted in the second area.

Note that the limitations “...used in both a probing test and assembly... are not used in the probing test... an application of pressure by a probe during the probing test being permitted in the first area... the application of pressure by the probe during the probing test being not permitted in the second area.” are functional in that they attempt to define the claimed structure “by what it does rather than what it is.” *Halliburton Energy Services Inc. v. M-I LLC*, 85 USPQ2d 1654, 1662 (Fed. Cir. 2008), citing *In re Swinehart*, 439 F.2d 210 (CCPA 1971). When

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a claim limitation is defined in purely functional language, applicant has the burden of showing that a prior art device that appears reasonably capable of performing the allegedly novel function is in fact incapable of doing so. See MPEP § 2114. In the case at hand, Applicant explains in his specification that certain structures are capable of performing the recited function. Because of the close structural similarity between these structures and those of the prior art device, the prior art device is apparently reasonably capable of performing the recited function. Applicant should, in his response, provide evidence that the prior art is incapable of performing the recited function, if such evidence is available. Note that an allegation that those skilled in the art were unaware that the prior art structure was inherently capable of performing the recited function is legally insufficient to show that the prior art lacks the inherent capability. See MPEP § 2112, part III (“There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure *at the time of invention*, but only that the subject matter is in fact inherent in the prior art reference”). Note that because the only issue is whether the functional limitation is in fact inherent in the prior art reference, an applicant’s explanation (and in fact any such explanation, made at any time, by anyone) of a given structure's ability to perform the recited function is available as evidence of that structure's inherent capability to meet the functional limitation.

In re Claim 2, Karasawa discloses the semiconductor device, wherein the dual use pads (1A – 20A) have a shape 31 compatible with both assembly and connection with the probe, and the assembly pads (1 -20) have a shape 33 compatible with only assembly (Drawing 2, [0016], [0018], [0026]).

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In re Claim 3, Karasawa discloses the semiconductor device, wherein the first area (25 outside 26) (Drawing 1) corresponds to an area above a peripheral region of the main surface of the semiconductor substrate 25, and the dual use pads (1A – 20A) are arranged linearly along a periphery of the main surface of the semiconductor substrate 25 (Drawings 1 and 5; [0016 – 0018, 0023, 0034]).

In re Claim 4, Karasawa discloses the semiconductor device, wherein the plurality of pads (1 – 20; 1A – 20A) further include probing test pads (1A – 20A) which are not used in assembly, and the probing test pads (1A – 20A) are further provided in the first area (25 outside 26) (Drawings 1 and 2, [0028 – 0029]).

Claims 7 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Heinen et al., European Patent Application Publication # EP 0 587 442.

In re Claim 7, Heinen discloses a semiconductor device having a plurality of connection pads 33 (Fig. 1) that are terminals for external connection positioned in a top layer above a main surface of a semiconductor substrate 13, and at least one wiring pad (29, 31) positioned in an inner layer (15, 17, 19, 21, 23) between the semiconductor substrate 13 and the connection pads 33, wherein in an overlap area, being a portion where the at least one wiring pad (29, 31) overlaps part or all of the connection pads 33 when viewed from the main surface of the semiconductor substrate 13, a potential of the wiring pad is the same as a potential of the connection pads (Fig. 1; column 2, lines 21 -58, column 3, lines 1 -58, column 3, lines 1 -8). Note that a potential of the wiring pad (29, 31) is inherently the same as a potential of the connection pads 33 because they are short-circuit connected (Fig. 1).

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In re Claim 13, Heinen discloses the semiconductor device, wherein the at least one wiring pad (29, 31) has two layers (15, 19), and a via 20 is not formed between a first 15 and second layer 19 of the portion where the at least one wiring pad (29, 31) and the connection pads 33 overlap when viewed from the main surface of the semiconductor substrate 13 (Fig. 1; column 2, lines 21 -58, column 3, lines 1 -58, column 3, lines 1 -8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinen as applied to claim 7 above, and further in view of Karasawa.

In re Claim 8, Heinen discloses all limitation of claim 8 except for that the connection pads are dual use pads used in both a probing test and assembly, whose shape is compatible with both assembly and connection with a probe.

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The difference between Applicant's claim 8 and Heinen' device is in the specifics of the connection pads.

Karasawa teaches that the connection pads (1A – 20A) are dual use pads used in both a probing test and assembly, whose shape 31 is compatible with both assembly and connection with a probe (Drawing 2, [0016], [0018, [0026]]).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine teachings of Heinen and Karasawa, and to use the specified connection pads to exclude damaging elements on a semiconductor chip as suggested by Karasawa (Abstract).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinen as applied to claim 7 above, and further in view of Pozder et al., US 2001/0051426.

In re Claim 9, Heinen discloses all limitations of claim 9 except for that the at least one wiring pad in the overlap area is connected to a drain of a transistor formed in the semiconductor substrate, and a shape of the overlap area is substantially the same as the shape of the connection pads.

The difference between Applicant's claim 7 and Heinen's device is in the specifics of the wiring pad connection.

Pozder teaches that the at least one wiring pad 133 in the overlap area is connected to a drain 104 of a transistor (104, 110, 108, 106) formed in the semiconductor substrate 100, and a shape of the overlap area is substantially the same as the shape of the connection pads 133 (Fig. 1; [0021 -0023]).

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It would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine teachings of Heinen and Pozder, and to use the specified connection to provide mechanically robustness such that forces applied by probing or packaging operations do not cause degradation of the bond pad or propagate to internal portions of the integrated circuit where other undesirable effects may occur as suggested by Pozder ([0008]).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinen as applied to claim 7 above, and further in view of Komatsu, US 2004/0089912.

In re Claim 10, Heinen discloses all limitations of claim 10 except for that a connection of a transistor gate is extended by a thin film formed on a surface of the semiconductor substrate at the portion which overlaps a connection pad, and by the at least one wiring pad at a portion which does not overlap the connection pads.

The difference between Applicant's claim 10 and Heinen's device is in the specific of the connection.

Komatsu teaches that a connection 30 of a transistor gate 2 is extended by a thin film formed on a surface of the semiconductor substrate 33 at the portion which overlaps a connection pad 46, and by the at least one wiring pad 5 at a portion which does not overlap the connection pads 30 (Fig. 2, [0029 -0033]).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine teachings of Heinen and Komatsu, and to use the specified connection in order to implement reinforcement of electromagnetic compatibility of a large-scale integration as suggested by Komatsu ([0001]).

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Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinen as applied to claim 7 above, and further in view of Tokuno et al., Japanese Patent Application Publication # 2000-164620.

In re Claim 11, Heinen discloses all limitations of claim 11 except for that the connection pads are composed of a portion used in the probing test and another portion, and the overlap area is a portion where the at least one wiring pad and the portion used in the probing test overlap when viewed from the main surface of the semiconductor substrate.

The difference between Applicant's claim 11 and Heinen's device is in the specifics of the connection pads.

Tokuno teaches that the connection pads 101 are composed of a portion 109 used in the probing test and another portion 110, and the overlap area is a portion where the at least one wiring pad 110 and the portion 109 used in the probing test overlap when viewed from the main surface of the semiconductor substrate (Drawing 1, [0014 -0017]).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine teachings of Heinen and Tokuno, and to use the specified connection pads for optimizing the area of an electrode pad as suggested by Tokuno (Abstract).

Note that the limitation "...used in the probing test..." is functional in that it attempts to define the claimed structure "by what it does rather than what it is." *Halliburton Energy Services Inc. v. M-I LLC*, 85 USPQ2d 1654, 1662 (Fed. Cir. 2008), citing *In re Swinehart*, 439 F.2d 210 (CCPA 1971). When a claim limitation is defined in purely functional language, applicant has the burden of showing that a prior art device that appears reasonably capable of performing the allegedly novel function is in fact incapable of doing so. See MPEP § 2114. In the case at hand,

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Applicant explains in his specification that certain structures are capable of performing the recited function. Because of the close structural similarity between these structures and those of the prior art device, the prior art device is apparently reasonably capable of performing the recited function. Applicant should, in his response, provide evidence that the prior art is incapable of performing the recited function, if such evidence is available. Note that an allegation that those skilled in the art were unaware that the prior art structure was inherently capable of performing the recited function is legally insufficient to show that the prior art lacks the inherent capability. See MPEP § 2112, part III (“There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure *at the time of invention*, but only that the subject matter is in fact inherent in the prior art reference”). Note that because the only issue is whether the functional limitation is in fact inherent in the prior art reference, an applicant’s explanation (and in fact any such explanation, made at any time, by anyone) of a given structure’s ability to perform the recited function is available as evidence of that structure’s inherent capability to meet the functional limitation.

Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heinen and Tokuno as applied to claim 11 above, and further in view of Karasawa.

In re Claim 12, Heinen taken with Tokuno discloses all limitations of claim 11 including that the connection pads 101 are dual use pads used in both the probing test 109 and assembly 110, except for that a shape of the portion used in the probing test is compatible with connection with the probe, and a shape of a portion used in assembly is compatible with only assembly.

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The only difference between Applicant's claim 12 and Heinen-Tokuno device is in the shape of the pad.

Karasawa teaches that the connection pads (1A – 20A) are dual use pads used in both a probing test and assembly, whose shape 31 is compatible with both assembly and connection with a probe (Drawing 2, [0016], [0018, [0026]]).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine teachings of Heinen, Tokuno, and Karasawa, and to use the specified connection pads to exclude damaging elements on a semiconductor chip as suggested by Karasawa (Abstract).

Allowable Subject Matter

Claims 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

In re Claim 5, Karasawa discloses all limitations of claim 5 except for “...a measurement in a pad pitch direction of the shape compatible with only connection with the probe is SMALLER than a measurement in a pad pitch direction of the shape compatible with only assembly”. Moreover, Karasawa teaches that a measurement (between 11A and 12A) in a pad pitch direction of the shape compatible with only connection with the probe is LARGER than a measurement (between 11 and 12) in a pad pitch direction of the shape compatible with only assembly (Drawing 1). The claimed device differs from prior art devices on this point and there is no evidence it would have been obvious to make this change.

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In re Claim 6, Karasawa discloses all limitations of claim 6 except for that "...the dual use pads and the probing test pads are arranged alternately ..." The claimed device differs from prior art devices on this point and there is no evidence it would have been obvious to make this change.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NIKOLAY YUSHIN whose telephone number is (571)270-7885. The examiner can normally be reached on Monday through Friday from 8 a.m. to 5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on 571-272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NIKOLAY YUSHIN/
Examiner, Art Unit 2893

/Thomas L Dickey/
Primary Examiner, Art Unit 2826